Shop Built Hollowing Rig with Laser for Mini Lathe

by Al Crandall

This is a shop made hollowing system with a laser guide which I designed and built for my Jet mini lathe. It is being tested by an unidentified club member at our all day turn-a-thon last month. It is constructed from ½" black water pipe, a couple of galvanized ¼" pipe nipples, some nuts and bolts, and some scrap ½" baltic birch plywood. The assembly has a rib supported plywood bed extension bolted to the end of the lathe upon which rides a pivoting plywood plate. This plate supports the two bars which constrain the boring bar extension and its outrigger. The boring bar is a 5/8" x 10" long hex head bolt from the shelves at the borg (Home Depot, Lowe's, Menards or whatever your local home center is) and is screwed 2" into the end of the black pipe and further held by a nut welded to the top of the pipe with a ¼–20 set screw for a grub. The working end has holes at 0 and 45° for the insertion of a 3/16" square tool bit and a ¼–20 set screw at the intersection of these two holes holds the bit in place.

The Jameson style anti-torque system has the ¼" pipe nipples tapped in each end for 5/16–18 hex head bolts. The black pipe bars are drilled two places each so that the ¼" nipples are a tight fit into the side of the pipe. A 5/16" hole exits the other side of the pipe and when a bolt is inserted and tightened in the four holes, the assembly becomes quite rigid. I was asked why I didn't just weld the assembly together. My answer is that, like most of the jigs which I make and show to others, I try to minimize the amount of complicated machining involved. A lot of people don't have access to welders, but they could still build this system with a marginally equipped shop.

The constraining bars are separated by a 3/8" carriage bolt and three nuts on each end. They are mounted using two pieces of hard maple which have a vee groove cut into each. Through trial and error I machined the vee on my table saw so that they would firmly grasp the lower pipe when screwed together, and then trimmed the width so that the pipe was proud of the top of the wood and the wood didn't interfere with the movement of the boring bar. The edge opposite the vee was trimmed to position the centerline of the boring bar (not the bar which resides in

the vee) at the spindle's centerline height. The support plate pivots to the front so that an offset tool can be easily threaded into a small hollowing hole, and to the back so that the offset tool can be used to its fullest when clearing under a wide rim.

The system is not positioned for its maximum hollowing depth in the photo below. The *tee nut* which holds the system to the lathe is built up from plywood and has a turned piece of cherry glued to the top which protrudes above the lathe bed to form an *axle* for the plate. Assembly is as follows: the tee nut is fitted to the bed, the extension is then bolted on, the plate is put onto its axle, and a large cherry washer with a steel washer and nut complete the assembly. The cherry washer overlaps the axle hole by about ¼" per side. A touch of candle wax rubbed on the stock tool rest, the restraint bar top, and the bottoms of the boring bar and the outrigger pipe make this system feel like it is gliding on air. There is essentially no friction.

The laser guide is adapted from one described in the AAW journal a couple of issues back and adjusts with one hand using one locking screw. I don't remember the name of the author. The laser turns on and off by twisting the head of a ¼–20 hex head screw which is threaded into the side of the PVC fitting and is positioned to press against the push button on the laser.

The bolt/boring bar extends about 8" from the end of the pipe extension because 2" is inserted into the pipe. About ½" is lost to the lathe tool rest, so there is about 7½" of usable bar. With the tool bit extending straight out from the end of the bar you would get back at least 1" of boring depth. I'm guessing that 8½" of boring on a mini lathe using a ⅝" diameter bar is just about maxing out the capabilities of everything involved. I personally have hollowed with this system a vase with an inside depth of 7½", and was surprised at how well the event progressed. I hollowed an egg to a depth of 6½" with a wall of less than ⅛" through a 1" entry hole using the laser guide. My hollowing skills would not have allowed me to do that without the laser. I hope this inspires someone else to build one of these systems.